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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 09/936,618 | 03/05/2002 | Norio Maeda | 33093M006 | 9087 |

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| EXAMINER | |
|---|---|
| LU, JIPING | |

| ART UNIT | PAPER NUMBER |
|---|---|
| 3749 | |

DATE MAILED: 08/31/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

| Office Action Summary | Application No. | Applicant(s) | |
|---|---|---|---|
| | 09/936,618 | MAEDA ET AL. | |
| | Examiner | Art Unit | |
| | Jiping Lu | 3749 | |

*-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --*

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1)☒ Responsive to communication(s) filed on *15 June 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4)☒ Claim(s) *1-3,5-12,14-24 and 26-28* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *21* is/are allowed.

6)☒ Claim(s) *1-3,5-12,14-20,22-24 and 26-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

**Application Papers**

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)
2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 112*

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claim 20 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 20, last paragraph, applicants claim a device for drying substrates having a number of nozzles that is determined in response to a size of the substrates and a pitch of the substrate. However, the specification failed to disclose how to determine the number of nozzles in response to a size of the substrates and a pitch of the substrates. No example was given in the specification for determining the number of nozzles based on the size of the substrates and the pitch of the substrates. Without undue experiments, one skilled in the art would not be able to determine the number of nozzles.

### *Claim Rejections - 35 USC § 102*

3. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

4. Claims 10-12, 14, 17, 22-24, 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Ferrell (U. S. Pat. 5,653,045).

Ferrell teaches an apparatus of drying substrate comprising a processing vessel 602 for holding substrates 601 at an angle of 0 degrees with respect to vertical in the processing vessel 602, means (not numbered, see Fig. 6) for supporting substrates 601 within the processing vessel 602, means 618, 620 for lowering a fluid face of the cleaning fluid 622 within the processing vessel with respect to the substrate, means 606 for introducing a drying fluid 607 under a liquid condition within the processing vessel using a nozzle 610 to form individual liquid drops of a drying fluid 607, and means 612,614 for supplying inert gas into the processing vessel same as claimed. The drying fluid 607 was introduced at room temperature under liquid condition into processing vessel 602 onto the fluid face 622 of the cleaning fluid. The fluid face 622 of the cleaning fluid was lowered with respect to the substrate and the vessel 602 was purges with hot nitrogen. Note column 10, line 10 to column 11, line 8; column 11, lines 30-31; and Figures 6 and 6. Means 612,614 is capable of supplying inert gas into the processing vessel during exhausting of the cleaning fluid from the processing vessel.

5. Claims 1, 3, 5, 7-10, 12, 14, 17, 22, 23 and 28 are rejected under 35 U.S.C. 102(b) as being anticipated by Mohindra et al. (U. S. Pat. 5,772,784).

Patent to Mohindra et al. shows a method and device for drying substrates comprising housing substrates 244 within a processing vessel 240 containing DI water, supporting the substrate within the processing vessel by supporting means 248, lowering the fluid face of the DI water through drain region231 by drain valve 236, introducing drying fluid through nozzle 306 and supplying inert gas into the processing vessel through nozzle 302, 304 during exhausting of the DI water from the processing (col. 10, lines 28-34) same as claimed.

***Claim Rejections - 35 USC § 103***

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 1-3, 5, 7-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ferrell (U. S. Pat. 5,653,045) in view of Mohindra et al. (U. S. Pat. 5,772,784) or Mehta et al. (U. S. Pat. 4,816,081).

Ferrell teaches a method of drying substrates comprising holding substrates 601 at an angle o f 0 degrees with respect to vertical in a processing vessel 602, purging vessel 602 with nitrogen, introducing a cleaning fluid 622, using low pressure nitrogen and nozzle 610 to form individual liquid drops of a drying fluid 607, introducing drying fluid 607 at room temperature under liquid condition into processing vessel 602 onto the fluid face 622 of the cleaning fluid, lowering the fluid face 622 of the cleaning fluid with respect to the substrate and purging the vessel 602 with hot nitrogen. Note column 10, line 10 to column 11, line 8; column 11, lines 30-31; and Figures 6 and 6. However, Ferrell does not teach supplying inert gas into the processing vessel during exhausting the cleaning fluid from the processing vessel. Mohindra et al. teach a concept of supplying inert gas into the processing vessel through nozzle 302, 304 during exhausting of the DI water from the processing (col. 10, lines 28-34) same as claimed. Mehta et al. teach a concept of supplying inert gas into the processing vessel during exhausting of the cleaning liquid from the processing vessel (col. 6, lines 24-30) same as claimed. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the substrate drying method of Ferrell to include a step of supplying inert gas

into the processing vessel during exhausting of the cleaning fluid from the processing vessel as taught by Mohindra et al. or Mehta et al. in order to improve the drying efficiency.

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ferrell (U. S. Pat. 5,653,045) in view of Mohindra et al. (U. S. Pat. 5,772,784) or Mehta et al. (U. S. Pat. 4,816,081) as applied to claim 1 as above, and further in view of Fung et al. (U. S. Pat. 6,216,709).

The substrate drying method of Ferrell as modified by Mohindra et al. or Mehta et al. as above includes all that is recited in claim 6 except for a pair of supporting members with grooves for supporting the wafers at different positions. Fung et al. teaches substrate holders 12 and 24 with grooves for supporting the substrates in multiple positions and to reduce water spots left on the substrates after drying. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to further modify the drying method of Ferrell to include a step of supporting the substrates at multiple positions as taught by Fung et al. in order to improve the drying efficiency.

9. Claims 15-16, 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ferrell (U. S. Pat. 5,653,045) in view of Fung et al. (U. S. Pat. 6,216,709).

The substrate drying device of Ferrell as above includes all that is recited in claims 15-16 and 26-27 except for a pair of supporting members with grooves for supporting the wafers at different positions. Fung et al. teaches substrate holders 12 and 24 with grooves for supporting the substrates in multiple positions and to reduce water spots left on the substrates after drying. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to substitute the substrate holders 12 and 24 of Fung et al. for the substrate

support member of Ferrell in order to support substrates in multiple positions and to reduce water spots left on the substrate after drying.

10. Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ferrell (U. S. Pat. 5,653,045) in view of Takase et al. (U. S. Pat. 6,152,153).

The substrate drying device of Ferrell as above includes all that is recited in claim 18 except for moving the nozzle closer to the substrate after it has been removed from the cleaning solution. Takase et al. teaches a concept of moving the nozzles across and toward the substrate for more precise directing of the drying fluid (col. 10, lines 42-63 and Figures 9 and 10). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the drying device of Ferrell to include moving nozzles as taught by Takase et al. in order to more precise directing of the drying fluid and to improve the drying efficiency.

11. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ferrell (U. S. Pat. 5,653,045) in view of Taniyama et al. (U. S. Pat. 6,247,479).

The substrate drying device of Ferrell as above includes all that is recited in claim 19 except for the circulation means for the liquid components. Taniyama et al. teaches a concept of using circulation means for keeping liquids for substrate treatment purified and leading to less contaminants on the finished substrate (co. 7, lines 27-49 and Figure 4). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the drying device of Ferrell to circulation means as taught by Taniyama et al. in order to keep liquids for substrate treatment purified and to reduce contaminants on the finished substrate.

### *Allowable Subject Matter*

12. Claim 21 is allowed.

### *Response to Arguments*

13. Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

### *Conclusion*

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jiping Lu whose telephone number is 571 272 4878. The examiner can normally be reached on Monday-Friday, 9:00 AM - 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ira Lazarus can be reached on 571 272-4877. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Jiping Lu
Primary Examiner
Art Unit 3749